

## PATENT COOPERATION TREATY

PCT

## NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents  
United States Patent and Trademark  
Office  
Box PCT  
Washington, D.C.20231  
ÉTATS-UNIS D'AMÉRIQUE

in its capacity as elected Office

<b>Date of mailing</b> (day/month/year) 13 October 1999 (13.10.99)	
<b>International application No.</b> PCT/GB99/00658	<b>Applicant's or agent's file reference</b> IPD/P2636/WOD
<b>International filing date</b> (day/month/year) 05 March 1999 (05.03.99)	<b>Priority date</b> (day/month/year) 10 March 1998 (10.03.98)
<b>Applicant</b> GREENAWAY, Alan, Howard et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

13 September 1999 (13.09.99)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was  
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO  
34, chemin des Colombettes  
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

C. Carrié

Telephone No.: (41-22) 338.83.38

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

D/IPR  
Attn. BOWDERY, Antony, Oliver  
Formalities Section (DERA)  
Poplar 2  
Bristol BS34 8JH  
UNITED KINGDOM

COMMUNICATION IN CASES FOR WHICH

NO OTHER FORM IS APPLICABLE

Date of mailing  
(day/month/year)

02/09/1999

Applicant's or agent's file reference

IPD/P2636/WOD

REPLY DUE

See paragraph 1 below

International application No.

PCT/GB 99/ 00658

International filing date  
(day/month/year)

05/03/1999

Applicant

THE SECRETARY OF STATE FOR DEFENCE et al.

1. ☐ REPLY DUE within \_\_\_\_\_ ~~NO~~ days from the above date of mailing☐ NO REPLY DUE

## 2. COMMUNICATION:

While inspecting the file for a.m. International Application this International Searching Authority has discovered that in the International Search Report mailed on 01/07/99 a classification has been cited incorrectly..

Please find enclosed a new Search Report which cancels and replaces the one already in your possession.

We want to apologize for any inconvenience caused.

A copy of this letter and its enclosures has been sent to the International Bureau of W.I.P.O. in Geneva.

Name and mailing address of the International Searching Authority



European Patent Office, P.B. 5818 Patentlaan 2  
NL-2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Patricia Klingens-Herklots

## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>IPD/P2636/WOD</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. <b>PCT/GB 99/ 00658</b>	International filing date (day/month/year) <b>05/03/1999</b>	(Earliest) Priority Date (day/month/year) <b>10/03/1998</b>
Applicant <b>THE SECRETARY OF STATE FOR DEFENCE et al.</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.



It is also accompanied by a copy of each prior art document cited in this report.

## 1. Basis of the report

- a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.



the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of the sequence listing :



contained in the international application in written form.



filed together with the international application in computer readable form.



furnished subsequently to this Authority in written form.



furnished subsequently to this Authority in computer readable form.



the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.



the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ Certain claims were found unsearchable (See Box I).

3. ☐ Unity of invention is lacking (see Box II).

## 4. With regard to the title,



the text is approved as submitted by the applicant.



the text has been established by this Authority to read as follows:

## 5. With regard to the abstract,



the text is approved as submitted by the applicant.



the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No.



as suggested by the applicant.



because the applicant failed to suggest a figure.



because this figure better characterizes the invention.

10



None of the figures.

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 99/00658

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 6 G11B7/135 G02B5/18

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
IPC 6 G11B G02B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 526 336 A (PARK TAI-SUK ET AL) 11 June 1996 (1996-06-11)  the whole document	1,7,8, 11,12, 15-18
A	---	2-6,9
X	US 5 721 629 A (LEE CHUL-WOO) 24 February 1998 (1998-02-24)  the whole document	1-3,7, 11,12, 15-17
A	---	4-6,18
	--- -/-	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

**\* Special categories of cited documents :**

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

25 August 1999

Date of mailing of the international search report

02.09.1999

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Annibal, P

## INTERNATIONAL SEARCH REPORT

International Application No

T/GB 99/00658

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	US 5 838 496 A (KAMIKUBO JUNJI ET AL) 17 November 1998 (1998-11-17)  the whole document	1-3,7, 11,12, 15-17
P,A X	-& JP 09 179020 A (ASAHI OPTICAL CO) 11 July 1997 (1997-07-11)  the whole document	4-6,18 1-3,7, 11,12, 15-17
A	---	4-6,18
E	US 5 892 748 A (KIKUCHI IKUYA) 6 April 1999 (1999-04-06)  the whole document	1-3,7, 11,12, 15-17
X	-& JP 08 249707 A (PIONEER ELECTRONIC CORP) 27 September 1996 (1996-09-27)  the whole document -----	1-3,7, 11,12, 15-17

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 99/00658

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US 5526336	A	11-06-1996	NONE		
US 5721629	A	24-02-1998	JP 2726029 B		11-03-1998
			JP 9017010 A		17-01-1997
US 5838496	A	17-11-1998	JP 9179020 A		11-07-1997
US 5892748	A	06-04-1999	JP 8249707 A		27-09-1996

PCT

REC'D - 5 JUN 2000

WIPO

PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference IPD/P2636/WOD	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB99/00658	International filing date (day/month/year) 05/03/1999	Priority date (day/month/year) 10/03/1998
International Patent Classification (IPC) or national classification and IPC G11B7/135		
Applicant THE SECRETARY OF STATE FOR DEFENCE et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 5 sheets, including this cover sheet.

- ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 13/09/1999	Date of completion of this report 31.05.2000
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Artelsmair, G Telephone No. +49 89 2399 8989 

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB99/00658

## I. Basis of the report

1. This report has been drawn on the basis of *(substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.)*:

### Description, pages:

1-28 as originally filed

### Claims, No.:

1-19 as originally filed

### Drawings, sheets:

1-23 as originally filed

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:



**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/GB99/00658

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Yes:	Claims	
	No:	Claims	1-19
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-19
Industrial applicability (IA)	Yes:	Claims	1-19
	No:	Claims	

**2. Citations and explanations**

**see separate sheet**

- 1 US-A-5526336 (D1) describes an apparatus for producing simultaneously a plurality of spatially separated images from an object field comprising: an optical system (5) arranged to produce an image associated with a first focus condition; a diffraction grating (4) arranged to produce, in concert with the optical system, images associated with each diffraction order, and means (11) for detecting images, wherein the optical system, diffraction grating and detection means are located on an optical axis and the diffraction grating is located in a suitable grating plane and is distorted substantially according to a diffraction function so as to cause the images to be formed under various focus conditions (see figure 2 in combination with column 3, lines 45-48, figures 5 and 7).

The subject-matter of claim 1 differs from what is described in D1 only in that it does not explicitly define the diffraction function as being a quadratic function. However the diffraction grating used in the apparatus according to D1 is not a standard grating having regular spaced strips but a distorted grating as used in the present application (see column 3, line 64 - column 4, line 1). It is clear that in D1 the same principle as in the present application is applied, i.e. varying the grating geometry such that different focus planes are produced for the +1, 0 and -1 diffraction order beams (see figures 3 and 4 and the corresponding description). In fact the (quadratically distorted) diffraction grating shown in figure 18 of the present application looks very much the same as the one shown in figure 3 of D1. In any way, as the applicants themselves admit, using a quadratic diffraction function for varying the focus condition of a beam is general knowledge in this field of art. Thus using a quadratic diffraction function is merely one of several straightforward possibilities from which the skilled person would select, in accordance with circumstances, without the exercise of inventive skill, in order to solve the problem posed.

It is true that the use of a quadratic order diffraction grating might lead to non-axial diffraction orders. However, for a skilled person it only depends

upon the circumstances of the desired application either to accept such a shift (as do the applicants with the embodiment of claim 1) or to correct it (as the applicants do with the embodiment of claim 4).

Consequently the subject-matter of claim 1 lacks an inventive step.

It should be noted that similar arguments also apply when starting from US-A- 5721629 (D2), US-A-5838496 (D3, used as a translation for JP-A-9179020) or US-A-5892748 (D4, used as a translation of JP-A-8249707)

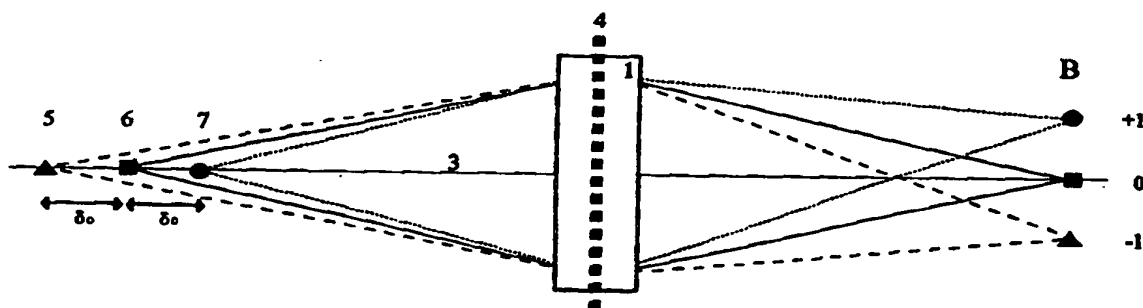
- 2 Dependent claims 2-19 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step, the reasons being as follows:

- Varying the diffraction function in order to produce different amounts of spherical aberration and to correct for spherical aberrations associated with different depth of planes: see D2, D3 or D4;
- Diffraction grating is either of amplitude-only, phase-only or phase and amplitude type: see D1-D4;
- Diffraction grating is polarization sensitive: see D1;
- Diffraction grating is of reflective or of transmissive type: see D1-D4;
- Producing substantially in focus images in a common image plane, from a plurality of object planes and using two gratings for illuminating and reading (it seems that this is what is meant by the rather cryptic wording of claim 16): see D1-D4;
- Three dimensional optical storage: see D1 or D3.

## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>6</sup> : <b>G11B 7/135, G02B 5/44</b>		A1	(11) International Publication Number: <b>WO 99/46768</b>
			(43) International Publication Date: 16 September 1999 (16.09.99)
(21) International Application Number: PCT/GB99/00658		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).	
(22) International Filing Date: 5 March 1999 (05.03.99)			
(30) Priority Data: 9804996.8 10 March 1998 (10.03.98) GB 9828365.8 23 December 1998 (23.12.98) GB			
(71) Applicant (for all designated States except US): THE SECRETARY OF STATE FOR DEFENCE [GB/GB]; Defence Evaluation and Research Agency, Ively Road, Farnborough, Hampshire GU14 0LX (GB).			
(72) Inventors; and (75) Inventors/Applicants (for US only): GREENAWAY, Alan, Howard [GB/GB]; DERA, Saint Andrews Road, Malvern, Worcs. WR14 3PS (GB). BLANCHARD, Paul, Micheal [GB/GB]; DERA, Saint Andrews Road, Malvern, Worcs. WR14 3PS (GB).			
(74) Agent: BOWDERY, Anthony, Oliver; D/IPR, Formalities Section, Poplar 2, MOD Abbey Wood #19, Bristol BS34 8JH (GB).		Published With international search report.	

(54) Title: THREE-DIMENSIONAL IMAGING SYSTEM



## (57) Abstract

A three-dimensional imaging system is described which exploits the defocusing of non-zero diffraction order images caused by the quadratic distortion of a diffraction grating (4). An optical system (1) is used such that objects (5, 6 and 7), located at different distances from grating (4), are imaged simultaneously and spatially separated on a single plane B.

**FOR THE PURPOSES OF INFORMATION ONLY**

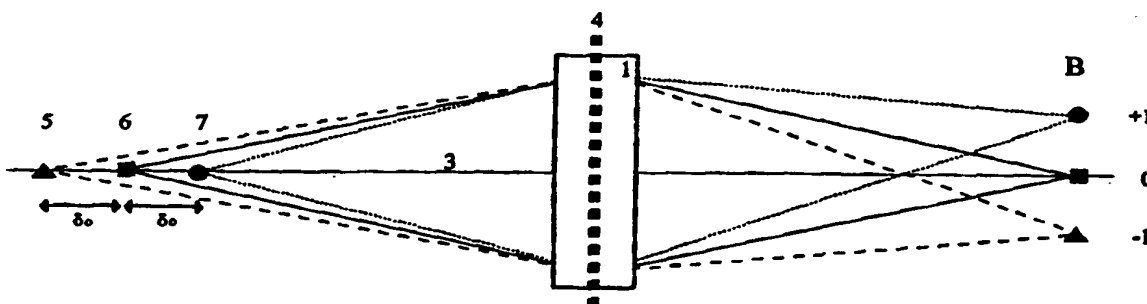
Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece			TR	Turkey
BG	Bulgaria	HU	Hungary	ML	Mali	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MN	Mongolia	UA	Ukraine
BR	Brazil	IL	Israel	MR	Mauritania	UG	Uganda
BY	Belarus	IS	Iceland	MW	Malawi	US	United States of America
CA	Canada	IT	Italy	MX	Mexico	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NE	Niger	VN	Viet Nam
CG	Congo	KE	Kenya	NL	Netherlands	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NO	Norway	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	NZ	New Zealand		
CM	Cameroon			PL	Poland		
CN	China	KR	Republic of Korea	PT	Portugal		
CU	Cuba	KZ	Kazakstan	RO	Romania		
CZ	Czech Republic	LC	Saint Lucia	RU	Russian Federation		
DE	Germany	LI	Liechtenstein	SD	Sudan		
DK	Denmark	LK	Sri Lanka	SE	Sweden		
EE	Estonia	LR	Liberia	SG	Singapore		

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>6</sup> : <b>G11B 7/135, G02B 5/18</b>		A1	(11) International Publication Number: <b>WO 99/46768</b>
			(43) International Publication Date: 16 September 1999 (16.09.99)
(21) International Application Number: PCT/GB99/00658 (22) International Filing Date: 5 March 1999 (05.03.99) (30) Priority Data: 9804996.8      10 March 1998 (10.03.98)      GB 9828365.8      23 December 1998 (23.12.98)      GB (71) Applicant (for all designated States except US): THE SECRETARY OF STATE FOR DEFENCE [GB/GB]; Defence Evaluation and Research Agency, Ively Road, Farnborough, Hampshire GU14 0LX (GB). (72) Inventors; and (75) Inventors/Applicants (for US only): GREENAWAY, Alan, Howard [GB/GB]; DERA, Saint Andrews Road, Malvern, Worcs. WR14 3PS (GB). BLANCHARD, Paul, Micheal [GB/GB]; DERA, Saint Andrews Road, Malvern, Worcs. WR14 3PS (GB). (74) Agent: BOWDERY, Anthony, Oliver; D/IPR, Formalities Section, Poplar 2, MOD Abbey Wood #19, Bristol BS34 8JH (GB).		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>With a revised version of the international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> (88) Date of publication of the revised version of the international search report: 21 October 1999 (21.10.99)	

(54) Title: THREE-DIMENSIONAL IMAGING SYSTEM



(57) Abstract

A three-dimensional imaging system is described which exploits the defocusing of non-zero diffraction order images caused by the quadratic distortion of a diffraction grating (4). An optical system (1) is used such that objects (5, 6 and 7), located at different distances from grating (4), are imaged simultaneously and spatially separated on a single plane B.

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece			TR	Turkey
BG	Bulgaria	HU	Hungary	ML	Mali	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MN	Mongolia	UA	Ukraine
BR	Brazil	IL	Israel	MR	Mauritania	UG	Uganda
BY	Belarus	IS	Iceland	MW	Malawi	US	United States of America
CA	Canada	IT	Italy	MX	Mexico	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NE	Niger	VN	Viet Nam
CG	Congo	KE	Kenya	NL	Netherlands	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NO	Norway	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	NZ	New Zealand		
CM	Cameroon			PL	Poland		
CN	China	KR	Republic of Korea	PT	Portugal		
CU	Cuba	KZ	Kazakhstan	RO	Romania		
CZ	Czech Republic	LC	Saint Lucia	RU	Russian Federation		
DE	Germany	LI	Liechtenstein	SD	Sudan		
DK	Denmark	LK	Sri Lanka	SE	Sweden		
EE	Estonia	LR	Liberia	SG	Singapore		

REVISED  
VERSION

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 99/00658

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 6 G11B7/135 G02B5/18

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 G11B G02B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 526 336 A (PARK TAI-SUK ET AL) 11 June 1996 (1996-06-11)  the whole document	1,7,8, 11,12, 15-18
A	---	2-6,9
X	US 5 721 629 A (LEE CHUL-WOO) 24 February 1998 (1998-02-24)  the whole document	1-3,7, 11,12, 15-17
A	---	4-6,18
	--- --	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

\* Special categories of cited documents :

\*A\* document defining the general state of the art which is not considered to be of particular relevance

\*E\* earlier document but published on or after the international filing date

\*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

\*O\* document referring to an oral disclosure, use, exhibition or other means

\*P\* document published prior to the international filing date but later than the priority date claimed

\*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

\*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

\*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

\*Z\* document member of the same patent family

Date of the actual completion of the international search

25 August 1999

Date of mailing of the international search report

02.09.1999

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentkan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Annibal, P



## INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 99/00658

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	US 5 838 496 A (KAMIKUBO JUNJI ET AL) 17 November 1998 (1998-11-17)  the whole document	1-3,7, 11,12, 15-17
P,A X	-& JP 09 179020 A (ASAHI OPTICAL CO) 11 July 1997 (1997-07-11)  the whole document	4-6,18 1-3,7, 11,12, 15-17
A	---	4-6,18
E	US 5 892 748 A (KIKUCHI IKUYA) 6 April 1999 (1999-04-06)  the whole document	1-3,7, 11,12, 15-17
X	-& JP 08 249707 A (PIONEER ELECTRONIC CORP) 27 September 1996 (1996-09-27)  the whole document -----	1-3,7, 11,12, 15-17

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 99/00658

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5526336 A	11-06-1996	NONE	
US 5721629 A	24-02-1998	JP 2726029 B JP 9017010 A	11-03-1998 17-01-1997
US 5838496 A	17-11-1998	JP 9179020 A	11-07-1997
US 5892748 A	06-04-1999	JP 8249707 A	27-09-1996